

METHOD FOR ACCESSING EXTENDED CAPABILITIES IN MOBILE COMMUNICATION DEVICE USING A SUBSCRIBER IDENTITY MODULE

TECHNICAL FIELD

This invention relates in general to mobile communication devices and their
5 operation, and in particular to mobile communication devices which use subscriber
identity modules to enable extended features.

BACKGROUND OF THE INVENTION

The use of subscriber identity modules (SIM) with mobile communication
devices is common in mobile communication devices used in communication systems
10 designed according to the Global Specification for Mobile (GSM) communications
standard. A SIM is used to store information such as phone numbers and names of
parties the user/owner of the SIM may wish to call. For the most part the user enters
the information into the SIM with the aid of the user interface of the mobile
communication device. The SIM can be removed from the phone and put into another
15 phone, allowing the user to use the new phone without having to re-enter all of the
phone numbers and names.

The data format of a SIM is dictated, in part, by a standards body. Certain
portions of the memory space in a SIM are allocated for certain types of data. When
inserted into a mobile communication device that recognizes the standard SIM format,
20 the mobile communication device can easily and correctly access the right information
for the activity in which the mobile communication device is engaged. For example,
phone numbers are stored in a predetermined and standardized format, beginning at a
predetermined memory address, and ending at a predetermined memory address.
However, a SIM can have more memory space than is needed to conform to the
25 standardized SIM format. This additional memory space may be used by
manufactures for specific functions and features of their mobile communication
devices, at least until that memory space also becomes described by a standard.

The fact that the additional memory space can, and is being used to provided
extended functionality beyond standard operation has the potential to cause problems.
30 If a user of a standard mobile communication device uses their SIM in another phone
having extended features, the mobile communication device should still function at

least as a standard mobile communication device. At the same time, features for which the user has not paid for should not be enabled. Therefore a need exists for a means by which standard and non-standard SIMs can be detected, and the appropriate features enabled or disabled.

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BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 shows block diagram of mobile communication device and an associated SIM for use with the mobile communication device, in accordance with the invention; and

FIG. 2 shows a flow chart diagram of a method of accessing extended capabilities in mobile communication device using a SIM.

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DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

While the specification concludes with claims defining the features of the invention that are regarded as novel, it is believed that the invention will be better understood from a consideration of the following description in conjunction with the drawing figures, in which like reference numerals are carried forward.

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Referring to FIG. 1, there is shown a block diagram 100 of mobile communication device 102 and an associated subscriber identity module (SIM) 104 for use with the mobile communication device, in accordance with the invention. The mobile communication device comprises a transceiver 105 for receiving and transmitting audio signals at radio frequencies. The transceiver is controlled by a controller 106, as is known in the art. The controller also functions in conjunction with other hardware such as displays and keypads to provide a user interface 108. Through the user interface the mobile communication device can receive commands from the user and display information to the user. The controller operates according to program instructions stored in a local non-volatile memory 110. The memory also stores code sections for implementing any extended features the manufacturer wishes to have the mobile communication device perform. One example of an extended feature is dispatch calling. By dispatch calling it is meant simplex or half-duplex calling between two or more mobile communication devices. Dispatch calling typically is performed by the user selecting a target identifier, then pushing a "push to talk" (PTT) button to initiate the call. In a cellular mobile communication device, the

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call is facilitated by a fixed equipment network that sets up and routes signals from the serving cell of the originating caller to the service cell of the target caller, as is known in the art. The memory is also provided with a directory address and feature signature file 111. The directory address can be a logical address, or a directory name of a
5 directory in the SIM and corresponds to an extended feature directory 112 if the SIM is the right type, i.e. an extended SIM. The SIM may be a standard or a non-standard SIM. A standard SIM contains only information for facilitating standard phone operation. A non-standard SIM facilitates extended or additional features or non-standard operation of the mobile communication device. If the SIM is a non-standard
10 SIM designed to facilitate the specific non-standard features of the mobile communication device, the information will be stored in a specific feature directory 112. If the feature directory is present in the SIM, and if it contains the desired information for facilitating extended features on the particular mobile communication device, the feature directory will contain a feature signature, such as a particular
15 character string. If the feature signature is present, the mobile communication device will enable use of the extended feature(s).

Referring now to FIG. 2, there is shown a flow chart diagram 200 diagram of a method of accessing extended capabilities in mobile communication device using a SIM. At the start 202, typically the mobile communication device is initialized, as
20 occurs, for example, when the mobile communication device is first power up or turned on. As part of the initialization process, the mobile communication device checks the SIM. Checking the SIM first starts by the mobile communication device fetching the address or name of the feature directory (204). In the preferred embodiment, the feature directory address is stored in a designated location the
25 codeplug of the mobile communication device. The codeplug is a section of non-volatile memory for storing parameters and data, as is known in the art. The device then searches the SIM (206) for a directory at the feature directory address, or having the feature directory name. If no directory is found at the address, or having the name of the feature directory, then the SIM is not an extended SIM, and only standard
30 features will be enabled (208). If a directory exists at the address, or having the same name, then the mobile communication device searches the directory for a feature signature (210). The feature signature is a file which is compared to a copy of the file

stored in the mobile communication device (212). The feature signature may be cryptographically encoded using asymmetric cryptography techniques to prevent unauthorized duplication. If the file found in the SIM matches the feature signature file stored in the mobile communication device, the mobile communication device
5 commences enabling the extended features (214). Upon ending the process (216), the mobile communication device will continue initialization, including initializing executable code for implementing the extended features.

It is contemplated that the invention may be used for several purposes. For example, since there are many wireless communication service providers in business,
10 many of these service providers, or carriers as they are alternatively known, desire to have the mobile communication device show a graphical carrier branding logo on a display of the device, such as in the user interface 108. This distinguishes the carrier from other carriers. The logo is stored in the SIM as an enhanced feature to be activated, and when the SIM is placed in another mobile communication device, the
15 same carrier logo can be displayed to inform the user which carrier is providing service.

The invention can also be used to customize the mobile communication device for a certain ergonomic performance. This is beneficial because when the user switches to another mobile communication device, the enhanced features can set up
20 the ergonomics of the new mobile communication device to be familiar to the user. Therefore, storing a preferred ergonomic set as an enhanced feature allows the user to be able to use different mobile communication devices with the SIM, while maintaining a familiar user interface. The ergonomics include aspects such as key mapping, message display, programming menus, and so on. By key mapping it is
25 meant the operation associated with the physical buttons or keys provided on the mobile communication device. By use of an enhanced ergonomic feature set, these can be defined based on the information in the enhanced ergonomic feature set. Thus, enabling the extended feature for an ergonomic feature set defines the ergonomic operation of the mobile communication device.

30 While the preferred embodiments of the invention have been illustrated and described, it will be clear that the invention is not so limited. Numerous modifications, changes, variations, substitutions and equivalents will occur to those

skilled in the art without departing from the spirit and scope of the present invention as defined by the appended claims.

What is claimed is:

1. A method of determining a value of a function of a variable, the method comprising:
receiving a value of the variable;
determining a value of the function of the variable based on the value of the variable;
outputting the value of the function of the variable.